

WHAT IS CLAIMED IS:

1. A programmable current controller comprising:
a programmable interface configured to program a digital reference in a memory,
wherein the digital reference corresponds to a predetermined driving current
for at least one illumination source;
5 a digital-to-analog converter coupled to the programmable interface and configured to
convert the digital reference into a first electrical parameter;
a comparator coupled to the programmable interface and configured to
compare the first electrical parameter with a second electrical parameter
corresponding to an operating driving current of the at least one
10 illumination source, and
generate a driving bias current; and
a current regulator coupled to the comparator and configured to
regulate the operating driving current of the at least one illumination source
according to the driving bias current, wherein the driving bias current
15 corresponds to a difference between the first and second electrical
parameters.
2. A programmable current controller according to claim 1, wherein
the comparator is a voltage comparator;
the first electrical parameter is a voltage corresponding to the predetermined driving
20 current for the at least one illumination source; and
the second electrical parameter is a feedback voltage corresponding to the operating
driving current of the at least one illumination source.
3. A programmable current controller according to claim 1, wherein
the comparator is a current detector;
25 the first electrical parameter is a current corresponding to the predetermined driving
current for the at least one illumination source; and

the second electrical parameter is a feedback current corresponding to the operating driving current of the at least one illumination source.

4. A programmable current controller according to claim 1, further comprising:
a sensor coupled to the at least one illumination source and configured to measure the
5 second electrical parameter.

5. A programmable current controller according to claim 5, wherein the sensor is
a resistor.

6. A programmable current controller according to claim 1, wherein the
programmable interface is an inter-integrated circuit serial interface.

10 7. A programmable current controller according to claim 1, wherein the
programmable interface is a three-wire serial interface.

8. A programmable current controller according to claim 1, wherein the current
regulator further comprises

a metal-oxide semiconductor transistor, wherein

15 a gate terminal of the metal-oxide-semiconductor transistor receives the
driving bias current,
a drain terminal of the metal-oxide-semiconductor transistor is coupled to a
power supply, and
a source terminal of the metal-oxide-semiconductor transistor is grounded.

20 9. A programmable current controller according to claim 1, wherein the at least
one illumination source comprises at least one light-emitting diode.

10. A display system comprising:

a display panel having at least one illumination source; and

a programmable current controller coupled to the at least one illumination source,

25 wherein the programmable current controller is configured to regulate an

operating driving current of the at least one illumination source according to a digital reference corresponding to a predetermined reference driving current.

11. A display system according to claim 10, wherein the display panel is a liquid crystal display panel.

5 12. A display system according to claim 10, wherein the programmable current controller comprises:
a programmable interface configured to program the digital reference in a memory;
a digital-to-analog converter coupled to the programmable interface and configured to
convert the digital reference into a first electrical parameter;
10 a comparator coupled to the programmable interface and configured to
compare the first electrical parameter with a second electrical parameter
corresponding to the operating driving current of the at least one
illumination source, and
generate a driving bias current; and
15 a current regulator coupled to the comparator and configured to
regulate the operating driving current of the at least one illumination source
according to the driving bias current, wherein the driving bias current
corresponds to a difference between the first and second electrical
parameters.

20 13. A display system according to claim 12, wherein the programmable current controller further comprising:
a sensor coupled to the at least one illumination source and configured to measure the
second electrical parameter.

14. A programmable current controller according to claim 12, wherein the sensor
25 is a resistor.

15. A method of regulating an operating driving current for at least one
illumination source of a display system comprising:

measuring a first electrical parameter corresponding to the operating driving current
of the at least one illumination source;
converting a digital reference into a second electrical parameter, wherein the digital
reference corresponds to a predetermined driving current for the at least one
5 illumination source;
comparing the first electrical parameter with the second electrical parameter;
based on the comparison, generating a driving bias current; and
regulating the operating driving current of the at least one illumination source
according to the driving bias current.

10 16. A method according to claim 15, wherein
the first electrical parameter is a feedback voltage corresponding to the operating
driving current of the at least one illumination source; and
the second electrical parameter is a voltage corresponding to the predetermined
driving current for the at least one illumination source.

15 17. A method according to claim 15, wherein
the first electrical parameter is a feedback current corresponding to the operating
driving current of the at least one illumination source; and
the second electrical parameter is a current corresponding to the predetermined
driving current for the at least one illumination source.

20 18. A method according to claim 15, wherein the digital reference is stored in a
memory.

19. A method according to claim 15, wherein the driving bias current corresponds
to a difference between the first and second electrical parameters.

25 20. A method according to claim 15, wherein the display system is a liquid crystal
display system.

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21. A method according to claim 15, wherein the at least one illumination source includes at least one light-emitting diode.